

OBSERVATIONS ON THE EUCALYPTS OF NEW  
SOUTH WALES.

## PART III.

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(Plates XXIX.-XXXIII.)

## EUCALYPTUS HÆMASTOMA, Sm.

*Introductory.*—The species is found in two principal varieties,—a coarse form (the type), and a slender one, the latter with small flowers and fruits, and known as variety *micrantha* in consequence.

As regards the type, the leaves, flowers and fruits are alike larger, and the leaves thicker, but, as a rule, the tree itself does not attain the magnitude of its variety.

With Bentham's amplified description of the species as given in B. Fl. iii. 212, we in the main agree, so that it will only be necessary to add a few notes.

*Vernacular names.*—"White Gum" is the commonest and most appropriate name for this species. As regards the vernacular names in the *Flora Australiensis*, Cunningham's name of "Blackbutt" is a misnomer and has probably arisen from confusion of this species with the "Mountain Ash" (*E. Sieberiana*), and the name of "Mountain Ash" for *E. hæmastoma* has probably arisen through too close reliance upon herbarium specimens, those of *E. hæmastoma* and *E. Sieberiana* being frequently difficult to discriminate unless complete material be available. The resemblances of the two species will be again referred to when *E. Sieberiana* is dealt with.

*Bark.*—Smooth, with a few ribbony flakes near the butt.

The species referred to in the following paragraph in the *Eucalyptographia* is most probably our *E. fastigiata* (*Proc. Linn. Soc. N.S.W.*), and we may mention that we have never seen true *E. hæmastoma* other than a white or at the most a ribbony gum.

“*E. hemastoma* occurs, however, also occasionally with bark persisting up to the last branches, according to Mr. Wilkinson, and would then come under the category of the Stringybarks; in such a state for instance it is known from the Dromedary Range up to 1,500 feet above the sea-level in the Silurian formation.” (N.B.—We have found it up to 3,000 feet on Tantawanglo Mountain.)

*Timber.*—Red, and of an inferior character, though a fairly lasting timber for posts in the districts in which it grows.

*Sucker leaves.*—Broadly lanceolate, somewhat similar in shape to the adult leaves, only larger; 4 to 6 inches long by  $1\frac{1}{4}$  inches broad, are measurements of some from the Sydney district.

*Mature leaves.*—Coriaceous, thick, spreading, and veins very distinct, oblique, and several starting from near the base of the leaf. As in the case of some other species, the mature foliage of trees growing close to the sea is very coarse and thick.

*Peduncles.*—Angular and flattened.

*Calyx-tube.*—Much longer than the operculum and insensibly tapering into the pedicel.

*Operculum.*—Pointed when young, becoming more hemispherical as maturity is approached. Often the buds may be described as clavate.

*Fruits.*—Not so flat-topped as *micrantha*. *Rim never depressed.*

Speaking generally the shape of the fruits reminds one of a pear. The rim is more or less domed and usually brownish or red (hence the specific name). We do not agree that, speaking at all generally, “the capsule is slightly depressed,” as stated at B.Fl. iii. 212.

Pedicels not so thin, being more tapering than is the case with var. *micrantha*.

Sometimes the fruits are hardly pear-shaped, but this is unusual. We have some nearly hemispherical, but much larger than those of var. *micrantha*. At the same time there are fruits which undoubtedly show transition between *E. hemastoma* and its variety *micrantha*.

In some cases trees belonging to this species have fruits in dense heads. In these trees the foliage is coarser and larger than that of var. *micrantha* usually is; at the same time the fruits, while numerous in the head, have thicker pedicels than those of var. *micrantha*; as regards size, the fruits are intermediate between the type and its variety. These clustered fruited forms occur on the Blue Mountains and on the Hawkesbury Ranges.

*Range*.—The typical species apparently does not extend much beyond the Hawkesbury sandstone, and is most abundant not far from Port Jackson, the Hawkesbury and George's River, and the ridges and broken country in the vicinity. While the range is not very precisely defined at present, that of the variety *micrantha* is undoubtedly very much more extensive.

*Affinities*.—Chiefly with *E. Sieberiana*, the only species (now that *E. virgata* has been abolished as a specific name) with which it could readily be confused.

#### E. HEMASTOMA VAR. MICRANTHA.

*Introductory*.—In many respects resembling *E. hamastoma*, but the flowers are much smaller and the tree is never rough on the lowest part of the trunk, but always smooth, right to the ground.

It is one of the most uniform of our Eucalypts, whether occurring on the coast sandy flats, or on the mountain ranges.

*Vernacular names*.—"White Gum" is a very common name. It, however, in one or other of the many districts in which it occurs, usually goes under some name referring to the softness or brittleness of its timber, e.g., "Cabbage Gum," "Snappy Gum," "Brittle Gum," "Brittle Jack."

*Bark*.—Smooth, right to the ground. The colour of the bark is usually white, but sometimes, particularly in localities comparatively remote from the sea, the bark is at certain seasons of the year yellowish. Away from the sea, also, the bark appears to have a greater tendency to peel off in patches, giving it more or less a spotted appearance.

*Timber*.—Soft, red. An excellent timber for fencing posts, and in some districts, especially the southern table land, preferred for this purpose.

*Sucker leaves* (very young).—Nearly ovate, then nearly oblong (rounded at both ends) and with crenulate margins. As growth proceeds, they become attenuate at both ends and somewhat falcate.

*Young foliage*.—Blue-green, a little glaucous, and with purple-brown twigs. Alternate, ovate-lanceolate, very acuminate, a little oblique, up to 6 inches long and  $2\frac{1}{2}$  broad. The intramarginal vein much removed from the edge. From this stage the foliage gradually develops into the mature stage.

*Mature leaves*.—These vary somewhat, which is not a matter for surprise, considering the extensive range of the tree. They are often thick and glossy. Those from Bargo Brush are of this character, and  $5\frac{1}{2}$  inches long and 1 to  $1\frac{1}{2}$  broad. Those from Queanbeyan are narrow-lanceolate. Some in the Sydney district are quite small, usually not exceeding 3 by  $\frac{1}{2}$  inch. The foliage of many trees in the Mudgee district is quite sparse. In the Macleay and Hastings districts the trees frequently have broadish, lanceolate long leaves up to 7 inches by  $1\frac{1}{2}$ . Sometimes the leaves are hooked at the ends, a character more general in Eucalypts than was at one time supposed.

But there is no doubt that the leaves of this form pass insensibly into those of the normal species. Specimens from the Blue Mountains (*e.g.*, Mt. Victoria) of var. *micrantha* show this transition very clearly.

*Peduncles*.—Some specimens show a radiate inflorescence and a very large number of flowers and yellow buds (*e.g.*, at Grenfell).

*Operculum*.—Nearly hemispherical or with a small umbo; less pointed than in the typical form.

*Fruits*.—The fruits are usually as flat-topped (they are but rarely slightly domed) as in any species of Eucalyptus, and therefore are not satisfactorily represented in the figure of *E. hamastoma* in the *Eucalyptographia*. The fruits are small, nearly hemi-

spherical, rarely tapered below, have thin pedicels, and are usually numerous. Some from Queanbeyan are  $\frac{5}{32}$  of an inch in diameter. Those from Grenfell, Bargo, &c., have flat tops and sharp rims. Some from the Mudgee district and south coast afford instances of slight doming of the fruits. Occasionally they are depressed hemispherical,—almost tazza-shaped. They are often pale coloured and with markedly red mouths.

We have fruits from Mt. Wilson which, though quite small, taper like those of normal *hemastoma*, and are in some respects connecting links.

*Range.*—This is much the most widely distributed form of the species. Besides New South Wales it is also found in Queensland, and in our own colony it extends from north to south, and from the coast across the tableland to at least as far west as Tumut, Bumberry and Mudgee.

*Size.*—Usually 30 or 40 feet in height, with a trunk diameter of 2 or 3 feet.

#### E. STRICTA, Sieb.

The original description of *E. stricta* (Sieb. *Cuv. post.* 195) is as follows:—*E. operculo submutico pedunculis lateralibus 2-floris foliis linearibus acutis coriaceis glabris subpunctatis.*

Bentham (*Flora Australiensis*) places the species in the *Porantheræ*, and gives the following notes concerning it:—

“Umbels several-flowered, often solitary in the axils, the upper ones in terminal corymbose panicles. Operculum usually conical, about as long as the calyx tube. Pedicels short. Leaves linear, thick, the oblique veins seldom visible. Umbels all axillary.”

He also places it in his allied series *Micrantheræ*, but as pointed out by Mueller (*Eucalyptographia*), in making this classification, he probably only had very young flowers for dissection.

*E. stricta* is usually considered to be the mountain form of a species, of which *E. obtusiflora* is the coast form.

In the *Eucalyptographia*, it is worthy of note that under *E. stricta* Mueller includes *E. virgata* and *E. Luehmanniana*, but not *E. obtusiflora*.

*General remarks.*—The name *stricta* is rather a happy one, though not exclusively characteristic. It is a shrubby species, with a number of thin stems of approximately equal diameter. It has been compared in habit to a Mallee, but it has no thickened root-stock. Height from 6 to 15 feet.

*Bark.*—Falling off in strips, leaving smooth stems.

*Timber.*—Pale coloured, but too small to furnish what is commercially known as timber.

*Mature leaves.*—Rigid, very coriaceous, varying from narrow-linear to ovate-lanceolate. Usually hooked at the apex. Often glossy.

It will be convenient to group the species with respect to the shape of the leaves. They, however, appear to run into each other by insensible gradations.

*a.* Coriaceous, lanceolate leaves, more or less falcate, almost acuminate. Average length  $3\frac{1}{2}$  to 4 inches, and breadth  $\frac{5}{8}$  inch.

*Hab.*—South Coast, *e.g.*, Sugar Loaf Mountain (Braidwood), Moruya and Candelo; also Blue Mountains.

Apparently large when growing in congenial situations, but leaves and fruits smaller when growing in bleak, sterile localities.

*b.* Coriaceous, linear-lanceolate, hooked leaves.

*Hab.*—Blue Mountains generally.

De Candolle, followed by Bentham, gives the leaves as linear-lanceolate or linear, but it is quite impossible to exclude broader leaved forms.

*Peduncles.*—Flattened or angular. Each with 4 to 8 (Bentham) or 5 or 6 (De Candolle) shortly pedicellate small flowers.

*Calyx tube.*—Not 2 lines in diameter, tapering.

*Operculum* very short, nearly hemispherical, surmounted by a point (umbonate). Much shorter than the calyx tube. Bentham speaks of the buds as ovoid. This is hardly true as a general rule. They are clavate, and often yellowish, especially the operculum. Bentham notes that the operculum is not longer than the calyx tube. It is usually very much shorter. It may be remarked that in regard to the general shape of the operculum, with its umbo, this species bears resemblance to *E. obtusiflora*.

*Anthers.*—The stamens are folded in the bud and the anthers are all fertile and renantherous.

*Fruits.*—Globose-truncate, smooth, often glossy, up to 5 lines broad and 6 deep, but varying in size, contracted at the orifice, *i.e.*, slightly urceolate, the rim narrow or thin, the capsule sunk, and the valves not protruding. Usually the valves are very much sunk, but occasionally (*e.g.*, at Wentworth Falls) the tips of the valves are flush with the top of the capsule.

Apparently the capsule is always sunk in Blue Mountain specimens, the edge of the capsule (rim) being thin and gradually sloping into the orifice.

A connecting link with the series of specimens (*obtusiflora*, &c., with a horizontal rim) is furnished by specimens from Sugar Loaf Mountain, Braidwood, where on the same plant are fruits of typical *stricta* with thin, sunk rim, and those with a broadish, scarcely sunk, horizontal rim.

The affinities in fruit are to some forms of *E. obliqua*, but the rim of the latter is thicker (see *Eucalyptographia*). The closest affinity is, however, with *E. obtusiflora*, as pointed out at page 715.

*Range.*—The Blue Mountains and the Braidwood and Moruya districts. The intermediate localities are not defined with certainty. It cannot be stated that the true *E. stricta* is found in the Port Jackson district, as recorded by Bentham.

#### E. STRICTA var. RIGIDA.

*General remarks.*—Forms a scrubby growth.

This plant is undoubtedly a small form of *E. stricta*, but as it is uniform in appearance it would be desirable to name it as a variety as a matter of convenience. Sieber's MS. name of *rigida*, under which it appears to have been distributed in the first instance, may be adopted.

*Vernacular names.*—Called "Boree" at Berrima, though the use of the name (usually given to an *Acacia*) should not be encouraged.

*Seedling leaves.*—Not seen.

*Mature leaves*.—Very coriaceous, narrow-linear. Not exceeding  $\frac{1}{4}$  inch in breadth, though 4 inches long. Neither the marginal nor transverse vein visible, or scarcely so. They strongly resemble those of *E. stellulata*, var. *angustifolia* (*E. microphylla*, A. Cunn.), but the two plants can be readily separated by means of their fruits.

*Buds*.—These often show a double operculum, in common with very many species of the genus. It may be that this double operculum will be eventually found to occur in all Eucalypts; we have observed it in a large number of species.

*Fruits*.—Much smaller than those of the typical form, slightly urceolate, much resembling those of *E. piperita*.

*Range*.—Berrima, Blackheath.

#### E. LUEHMANNIANA, F.V.M.

This small tree was originally described by Mueller (*Fragm.* xi. 38) as *E. Luehmanniana*. The species was suppressed by the author in his *Census* (1st Edition, 1882), but not before he had included it under *E. stricta* (*Eucalyptographia*). In the 2nd Edition (1889) of the *Census* it appears (by reference) under *E. virgata*, Sieb., which species itself had been suppressed in the 1st Edition of the work. Baron von Mueller was, as a rule, averse to naming varieties however well marked. There is little doubt that, had he again named it, it would have been under the style *E. virgata*, var. *Luehmanniana*. The late Rev. Dr. Woolls used to regard it as a variety of *hemastoma*, and used to name it *grandiflora*, stating, in a letter, "many Eucalypts, e.g., *punctata*, *resinifera*, have a *grandiflora* form, and so has *hemastoma*." Although for the last few years of his life he consistently held this view, we cannot find that he put it in print.

We are of opinion that it would be a matter of convenience to revive Mueller's species of *Luehmanniana*. It bears affinity to at least two species, but we are of opinion that the course we propose is less free from objection than to consider it a variety of either. Although *E. Luehmanniana* eventually passes into *E.*



*obtusiflora*, the form with which it possesses closest affinity, we would point out that each case of nomenclature must be considered on its merits, and that many Eucalypts, whose specific value is not at present disputed, possess a large series of varieties which insensibly pass into those of other species.

Mueller (*Fragm.* xi. 38) has already described the tree pretty fully; there is no necessity for us to repeat this, and we content ourselves by emphasising certain points, some of which have not been touched upon in the original description.

*General remarks.*—This species is glaucous, even nearly white. At the same time it imperceptibly passes into non-glaucous forms. The branchlets are angular, and the species is coarse.—peduncles, fruits, leaves, &c., being alike large. These three points are the most obvious indications of the species.

*Bark and timber.*—Apparently the same as *E. stricta* and *obtusiflora*.

*Seedling leaves.*—Coarse, up to 7 inches long by 4 inches wide. The resemblance to those of *E. hamastoma* is striking.

*Mature leaves.*—Distinctly falcate, up to 8 inches by  $1\frac{1}{2}$  inches. Coriaceous; edges thickened; marginal vein usually at a little distance from the edge.

*Peduncles.*—Very much flattened. We have specimens which spread out upwards, so much that they are  $\frac{1}{2}$  inch wide at the place of attachment of the inflorescence. Top of peduncle quite broad and fleshy in which the pedicels are articulate.

*Buds.*—Angular, pointed.

*Calyx-tube.*—The calyx often tapers into a widely expanded lobe, which is articulate on a broad-topped common peduncle; usually 7 flowers in a head.

*Operculum.*—Double operculum or large calyptra-like bracts enveloping the whole head of flower-buds, and only thrown off when the individual flower-buds are nearly ready to throw off their own opercula.

*Stamens.*—Nearly all fertile.

*Fruits*.—Often pale brownish and glossy, 5-celled, corrugated—partly due to drying; the rim slightly projecting.

Specimens from the north of Port Jackson (between this estuary and the Hawkesbury River) appear to differ from the type only in the following particulars:—

1. They are glabrous.
2. The calyx-tube is more elongated and the stalk of the fruit thinner.

The most obvious difference is the almost entire absence of glaucousness; no other difference is obvious or constant.

Plants from the Spit (Middle Harbour, Sydney) have the buds quite pointed, and long, with non-glaucous leaves. This is a form which would be separated from *E. obtusiflora*, with greater or less reluctance, according to the elasticity of view held in regard to the definition of *E. obtusiflora*.

*Range*.—Near Bulli (F.v.M.), thence as far north as Middle Harbour, Port Jackson, but the precise northerly range not yet defined.

Following are notes upon a mountain variety of the preceding species:—

E. LUEHMANNIANA var. ALTIOR, nobis.

We have observed at Mt. Wilson (the precise range we do not know) a tree which may be described as a form of *E. Luehmanniana*, with fruits and all other parts comparatively small. The following notes will render the resemblances and differences clear:—

Immature foliage, inflorescence and fruits, also twigs, all glaucous.

*General remarks*.—A tree of 60 or 70 feet with a trunk diameter up to 2 feet. It will be observed that the tree is far larger than that of *E. Luehmanniana*, a circumstance which we record in the name *altior*.

*Bark*.—Smooth, with some bark near the butt, falling off in ribbons. A "White Gum."

*Timber*.—Pale coloured.

*Seedling leaves*.—Not seen.

*Mature leaves*.—Very similar to those of *E. Luehmanniana*, with perhaps the following differences :—

The leaves are thinner, the petioles less flat, and there is a greater tendency in the lower leaves for the veins to proceed right from the base of the leaf. Rarely longer than  $4\frac{1}{2}$  inches or broader than 1 inch.

*Peduncles*.—Very much flattened, in proportion to the size of the fruits, perhaps as much so as is the case in the preceding form.

*Calyx tube*.—Similar to the preceding, though less angular. Usually 7 flowers in a head.

*Operculum*.—Proportionately smaller, also less pointed. Pale coloured operculum like some of the slightly pointed-operculum coast-forms of *obtusiflora*.

*Fruits*.—Flat-topped; when not fully ripe quite glaucous, with the exception of the rim which is red, contrasting strongly with the remainder of the fruit, which is smoother than the preceding. Pale brown and shining when fully ripe; from nearly hemispherical to subconical, the edge of the rim sharp, and 5-celled.

*Dimensions*.—Greatest length and greatest breadth of fruit about  $\frac{7}{16}$  inch. Width of rim in mature fruit  $\frac{1}{8}$  inch.

*Range*.—In the taluses of the sandstone cliffs about Mt. Wilson.

#### E. OBTUSIFLORA, DC.

*General remarks*.—*E. obtusiflora* is recognised as a species in the *Flora Australiensis*; it is ignored as a species, and only very incidentally alluded to (under *E. stricta*) in the *Eucalyptographia*.

We think that *E. obtusiflora* should be retained as a species. At the same time we have a series of specimens absolutely connecting it with *E. Luehmanniana*. It, however, differs from that species in several important particulars :—

(1) Size and curvature of leaves. Those of *E. obtusiflora* are small, broad in comparison with their length, shiny, thick, usually blunt, and with strongly marked veins.

(2) Shape of fruits—being more subcylindrical than those of *E. Luehmanniana*.

(3) In the peduncles and shape of the buds.

Following are notes on three trees from the Spit, Middle Harbour, Port Jackson.

(a) 15 feet high. Angular twigs, pale-coloured foliage, the leaves falcate and hooked, 2 to  $3\frac{1}{2}$  inches, or rarely 4 inches long. Pointed yellowish operculum. Fruits 5-celled, over  $\frac{1}{2}$  inch long by about  $\frac{5}{16}$  across, and pale-coloured. They have a long, broad common peduncle, and the calyx is elongated and continuous with the pedicel.

(γ) Operculum (as figured) pointed. Fruits 5-celled, flat-topped or a little domed (as figured) and barely half an inch long. The common peduncle elongated, and much flattened upward.

(δ) Operculum pointed. Fruits half an inch long, flat-topped, but sunk, angled, in addition to a certain amount of longitudinal folding, the result of shrivelling, common to both *E. obtusiflora* and *Luehmanniana*. Leaves very shiny, thick, and with strongly marked venation.

These three forms are strong connecting links with *E. Luehmanniana*.

Following is a connecting link with *E. stricta* :—

(θ) A small tree from Middle Harbour, Sydney, about 9 feet high, with a white-grey smooth bark, the old bark leaving the tree in long dark-coloured shreds. Buds clavate, and with double operculum. Fruits about  $\frac{3}{8}$  inch long, of the shape of those of *E. stricta*, but with a thicker rim, and less sunk, 4-celled. The leaves linear-lanceolate, 5 inches by  $\frac{1}{2}$  inch.

*Bark*.—Lead-coloured; falling off in ribbons. Not greatly different from *E. stricta* and *E. obtusiflora*.

*Timber*.—Like *E. stricta*.

*Seedling leaves.*—Broadly lanceolate, somewhat similar in shape to the adult leaves, only larger. Approximate dimensions 4 to 6 inches long by  $1\frac{1}{4}$  inch broad.

*Mature leaves.*—Rigid, very coriaceous, ovate-lanceolate, slightly oblique, leaves sometimes blunt, sometimes hooked; rarely 1 inch wide (usually  $\frac{3}{4}$ ) and up to 4 inches or a little more long. The venation marked.\* Colour of leaf pale or yellowish-green, often glossy, and the margin often reddish. The intra marginal vein some distance from the margin. The transverse veins (see figure 22) starting out at a fairly uniform angle to the midrib. As Bentham puts it (B Fl. iii. 189); "Leaf veins not close, often very oblique, but all inserted along the midrib."

*Peduncles.*—Somewhat angular.

*Buds.*—Clavate and umbonate, even pointed.

*Calyx-tube.*—Short and broad (Bentham), but this not a constant character.

*Operculum.*—Specimens from Botany and National Park have the operculum hemispherical, apparently without sign of umbo. This species frequently shows the double operculum.

*Anthers.*—In describing *E. stricta*, it has been alleged that Bentham has described the anthers of another species. He, however, emphasises the shape of the anthers where (B. Fl. iii. 218), alluding to the difference between *E. stricta* and *E. stellulata*, he says, "Some specimens, confounded with *E. stricta* by A. Cunningham, belong to the narrow-leaved form of *E. stellulata*, in which the veins are sometimes inconspicuous, but which is readily distinguished by the shape of the buds, the reniform anthers, &c."

*Fruits.*—4- to 5-celled, flat-topped, wrinkled, brown and shiny like *E. Luehmanniana*, but smaller. Some specimens from Loftus have slightly urceolate 4-celled fruits, which have thin rims, and are depressed.

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\* This is especially the case where the trees grow close to the coast.

Some fruits from Botany are almost hemispherical and 5-celled; they are apparently a connecting link with *E. stricta*. We are of opinion that it is not possible to discriminate between some forms of *stricta* and *obtusiflora* without fruits.

*Range*.—In its typical form confined to the coast, and apparently at no great distance from Port Jackson.

### *E. VIRGATA*, Sieb.

The original description of *E. virgata*, Sieb., (*Uur. post.* 195) is as follows:—"E. operculo conico pedunculis 3-floris incrassatis compressis rugosis erectiusculis foliis lanceolatis acuminatis coriaceis subvenosis glabris."

This was expanded by De Candolle (*Prod.* iii. 217) into the following words:—

"Operculo conico cupulae longitudine, pedunculis axillaribus lateralibus petiolo vix longioribus pedicellisque ancipitibus, foliis oblongo-linearibus utrinque acuminatis crassiusculis coriaceis subaveniis. Foliis petiolus 4 lin. longus, lamina 4-6 poll. longa 6-9 lin. lata. Umbellae 5-6-florae. Margo folii crassiusculus."

It will thus be seen that Sieber had the temerity to describe the species from foliage and buds only—a course fraught with danger in the vast majority of species, as subsequent experience has amply shown. This imperfect description has been the cause of much trouble in later years.

*E. virgata* is redescribed by Benthau (*B.Fl.* iii. 202) . . . "Chiefly from Oldfield's, Woolls's and F. Mueller's specimens. Sieber's appear to be the same, but they are only in young bud, and, therefore, uncertain. It differs from both *E. coriacea* and *E. obliqua* in the outer stamens bearing only abortive anthers, and in that respect approaches *E. hamastoma*, from which it differs as well in foliage and in fruit, as in these imperfect stamens being much fewer and rarely, if ever, quite without anthers."

*E. virgata* was in 1884 considered by Mueller (*Decade* 10, *Eucalyptographia*) as a form of *E. stricta*.

Previously, however (in 1880), the species was regarded by Mueller, in the same work, as a synonym of *E. Sieberiana* (Decade 2).

Bentham (B.Fl. iii. 202), in referring to *E. virgata* as "Mountain Ash" (Twofold Bay), a tree which is undoubtedly *E. Sieberiana*, adds to our difficulties. He refers to the true "Mountain Ash" (*E. Sieberiana*) in describing *E. virgata* as a tree with "furrowed persistent bark," and in other respects, in the same description, has the tree we now know as *E. Sieberiana* in view. *E. Sieberiana* is a name not employed by Bentham, being coined later by Mueller (*Eucalyptographia*).

We will discuss the matter further under *Sieberiana*, only adding, at this place, that Mueller's drawing of *E. Sieberiana* appears to us to more correctly depict a form of *E. hamastoma*.

*E. virgata* as a specific name was ignored by Mueller until the publication of the 2nd Census in 1889. The absence of a pictorial illustration by Mueller of *E. virgata*, as distinguished, from *E. Sieberiana*, is keenly felt under all the circumstances; in fact it does not appear that the species has ever been figured, except in the work alluded to (when considered to be synonymic with *E. Sieberiana*).

The differences usually empirically considered as separating *E. virgata* from *E. Sieberiana* are indicated as follows:—

*E. virgata*.—Stamens all fertile. Leaves always falcate. Plant always virgate.

*E. Sieberiana*.—Outer stamens sterile. With paler leaves than the preceding.

Such is a résumé of the affinities of what different botanists have considered to be Sieber's *virgata*. The conclusions being so unsatisfactory, and even contradictory, we determined to begin *de novo*.

We are indebted to the kindness of Mr. J. G. Luehmann for a specimen identical with Sieber's *E. virgata*, in bud only, collected in a coastal district of this colony, near Bulli.

We unhesitatingly refer it to one of the numerous forms between *E. Luehmanniana* and *E. obtusiflora*. Our determination confirms

the affinity of *E. Luehmanniana* and the so-called *E. virgata*. Sieber's *E. virgata* may be looked upon as either a glabrous form of *Luehmanniana* or a pointed-operculum form of *obtusiflora*. To speak as definitely as possible, we define it as a glabrous form of *E. Luehmanniana* (connecting with *E. obtusiflora*). It is an imperfectly described form oscillating between two species; it has remained a name for three quarters of a century, disturbing *Eucalyptus* nomenclature, and no one ever dared to figure it as a species.

All that remains is to give the name of *E. virgata* decent interment, and we look upon the absolute identification of Sieber's species as an important point in our paper. *E. virgata* perplexed us for years, and the more we examined into its identity the greater the confusion appeared.

*Concluding remarks.*—On reviewing a very large series of specimens we cannot but be struck with the points in which *E. stricta*, *E. obtusiflora*, *E. Luehmanniana*, and *E. hæmastoma* resemble one another.

While there are undoubted affinities between *E. obtusiflora* and *E. Luehmanniana* (and between these two and *E. hæmastoma*), the type forms are very different in appearance. Ampler opportunities for investigation have shown that there are connecting links between species of *Eucalyptus* which, at the time of describing them, were not apparent, and the application of names to many forms is preserved simply as a matter of expediency. It may be stated as our carefully formed opinion that the judicious application of names to varieties is expedient as it helps the student and observer, and introduces definiteness into this protean genus.

By the names we have adopted, we have indicated to some extent our opinion of the affinities of the various forms dealt with by us. At the same time, since there are connecting links between all the forms, it is possible for a botanist who holds strong ideas in regard to the consolidation of species, to adopt a classification different from our own. It is interesting, for instance, to view them as varieties of one comprehensive species—*hæma-*



*stoma*, *E. stricta* being the form most remote from the species referred to. Still there is much to be said in favour of this large species with its varieties, and examination of the various trees from this point of view brings out points of similarity and dissimilarity between them which perhaps would not otherwise have been presented to us.

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## EXPLANATION OF PLATES.

(See pages 794-795.)